Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

the close of the Lafayette epoch and the opening of the Kansan epoch was longer than all the time since. If we do not adopt any very large factor of safety, the known evidence will imply a length of time for the Ozarkian period twice and, perhaps, thrice as great as all subsequent time. Therefore, by reason of its length and other features in some respects peculiar to it, the Ozarkian period, or more properly sub-period, may be considered co-ordinate with the Glacial sub-period, the two to constitute approximately equal divisions of the Pleistocene period as in the table on page 113.

THE POCKET, OR POUCHED GOPHER.

(*Geomys bursarius.*)

BY CLEMENT L. WEBSTER.[1]

In passing over the beautiful prairies of the west, especially in portions of Iowa and southern Minnesota, the attention of the traveler is arrested by the great number of isolated or grouped mounds, which are seen over the surface.

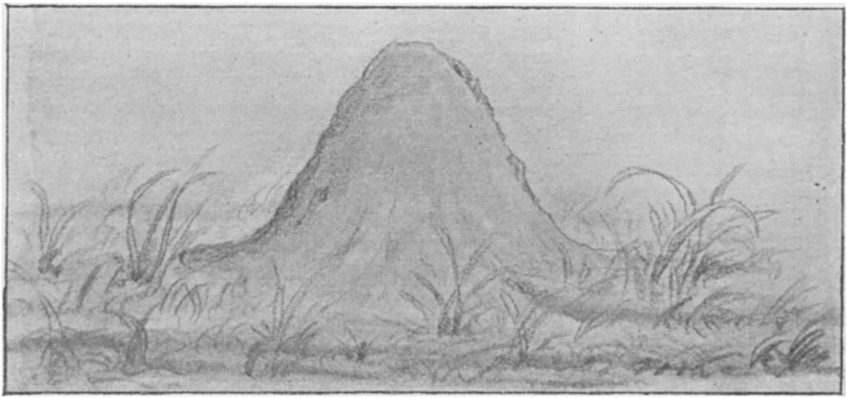
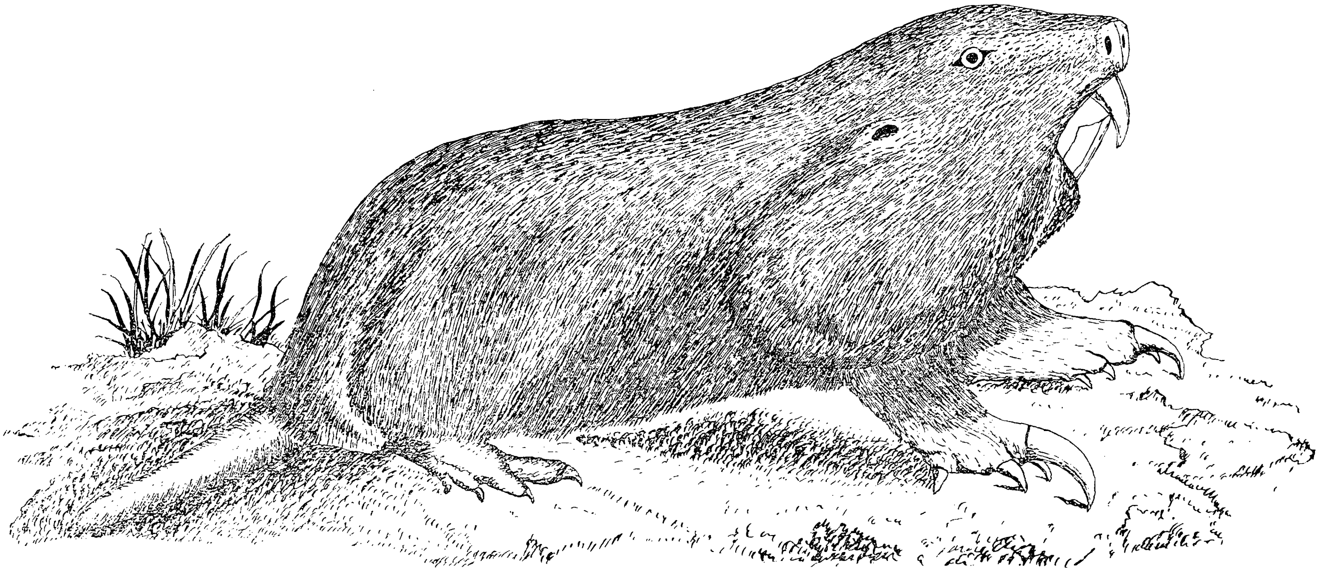


FIG. 1. Geomys bursarius.

These mounds are generally circular, and have a rounded or flattened top; and a diameter, at the base, of from four to twenty feet; and usually rise to a height of from one to three feet.

[1] Charles City, Iowa.

PLATE VI.



Geomys bursarius.

Although the marginal outline of these mounds are usually circular, still, some of them are oblong, or have a gently flowing contour.

These mounds are isolated from five rods to one mile from one another, or are closely and irregularly grouped, or arranged in rude circles, semicircles, or even straight lines.

In some instances, we have counted as many as sixteen of these mounds in an area containing about two acres.

The locations of these mounds are exclusively in the prairie regions, and may be found on either high and dry, or on low and rather moist land. In Iowa and Minnesota, where I have devoted considerable study to these "peculiar mounds," they may be seen for many miles over the level prairies.

By far the greater number of these mounds owe their origin to the Pocket Gopher, (*Geomys bursarius*), which, year by year made additions to them by the dirt brought forth in the extension of their undergrôund channels, until they finally assumed the proportions now seen.

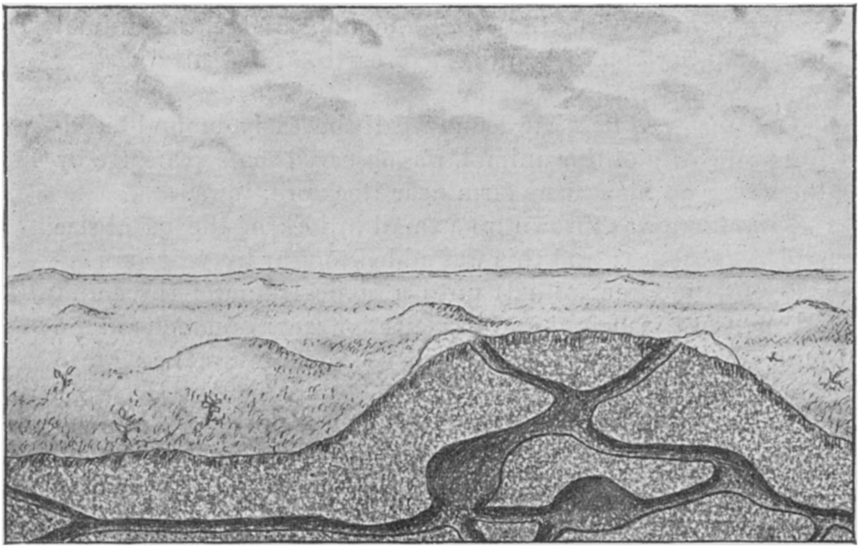


FIG. 2. Geomys bursarius.

Upon the death of the animal, or for some other cause, these mounds, and channels, were finally abandoned, and the mounds left to be taken possession of by the indigenous plants of the region, which are always, under such circumstances, of much ranker growth than is usual under other conditions.

Although I have been a resident of Iowa for more than twenty-eight years, yet comparatively few of the mounds under consideration have been reared by these Rodents during that time.

The question may arise: If nearly all these structures (which are very numerous) are the works of *Geomys bursarius*, why are there so very few of them in process of erection to-day.

To this query, we conceive of but one or two satisfactory replies; and this is: In the somewhat remote past, this species reached its culmination, or greatest expansion, in the regions under consideration; and that to-day witnesses its final decline; or else, that for an indefinite time in the past, this animal was a resident here, the mounds witnessing to their long abode, and upon the advent of the white settlers and the breaking up of the wild prairie lands, its mound-building propensities, or habits, was, to a considerable extent, modified.

Instead of erecting these great mounds to-day, this animal usually throws up little hillocks of earth, as described farther on in this paper.

One instance of what I may call the early mound-building propensity of this animal, was observed some years ago by the writer on his fathers farm near Rockford, Iowa.

First there was thrown up a small hillock of the usual size and appearance; and this was added to year by year (apparently by the same animal) until a conical mound three and one half feet in height and perhaps five feet in diameter at the base, was reared; when for some cause the animal ceased to work here.

In this instance several small mounds or hillocks were seen in the vicinity.

In fig. 1 is shown a sketch of this conical mound as last seen by the writer.

Some of the early writers on this subject have supposed that the great mounds of the prairies referred to, represent the ruins of ancient "muskrat houses" the builders of which existed here when the country was far wetter than now—in fact when the country was almost one great "slough."

Others believe them to be the "burial mounds of the Indians;" while still others of these writers attribute their origin to various causes.

In Fig. 2 is given a sectional view (and it conveys a good general idea of internal structure of nearly all of them) of one of these mounds as explored by the writer.

In nearly all cases the old, and sometimes recent, nests of this animal is found in the large expansions of the burrows in the mounds; with sometimes the decayed remains of stored food.

In a few cases it has been found that this animal has in recent times, taken up its abode in these mounds and here reared its young.

In one case, in 1895, near Rockford, Iowa, there was found in one of these mounds what was pronounced to be human bones, by a Physician at Rockford.

As to the correctness of this identification, however, I am unable to state, not having personally examined the relics. If, however, they were undoubted human bones, they then simply represent an intrusive Indian burial here during the early days of the country.

As a general rule, no small hillocks are thrown up by the Pocket Gopher, or seen near, the large mounds herein treated of.

The Pocket Gopher is usually considered a great pest; although not altogether because of the quantity of grain, etc., eaten.

They do not often destroy much grain by eating it, though they not infrequently get into a shock of wheat or barley and eat the heads of a few bundles and cut the bands of many others, and raise little hillocks in the shocks, from seven to fourteen inches in height and ten to twenty inches in diameter.

Considerable damage is done by this animal in gardens, both by eating the vegetables and covering many others with their mounds of earth. "When their holes run through a hill of potatoes, they always clean out the hill." "Sometimes they do noticeable damage in a patch of potatoes."[2]

The greatest damage done by this Gopher, however, is in covering small grain and grass with the earth they throw from their holes; the injury done in this way, is, in some sections, considerable.

During the latter part of March (1889), I counted, near Rockford, Iowa, ninety hills, from five to nine inches in height and one to three feet in diameter, thrown up by these Gophers in a field of Clover and Timothy. These mounds were all located in an area four by five rods in extent.

Their channels are at times quite straight for some distance; but most usually they frequently bifercate, or are somewhat tortuous.

Little hillocks, averaging from five to eight quarts of earth each, are brought to the surface, along the line of work, at irregular intervals; the distance between them varying from twelve inches to five feet. At other times only a single hillock will be observed in the vicinity; the animal filling the burrow behind him as he pursues his nocturnal way. If any channel be opened, which has even been closed for a long period, it will most usually be filled again very soon, by the Gopher; thus showing that, generally, all the underground galleries are frequently traversed by their inhabitant.

The burial mounds of the prehistoric inhabitants of Iowa, are frequently taken possession of by these Rodents, and the bones of the interred often gnawed; thus giving rise to the supposition, in the minds of some, that this evidences to the cannibalistic habits of the originators of these monuments. This species lays up large stores of food for winter, such as corn, wheat, buckwheat, and other grains, as well as roots and stems of weeds, which are usually cut up into short pieces.

The store of food laid up, is generally much greater than is used. Under straw-stacks, on western farms, where the soil is not frozen, this Gopher sometimes works all winter.

It is stated by Mr. Bailey (*loc. cit.*) that "Pocket Gophers work mostly by night." So far as my personal observations extend, however, it is shown that fully as great an amount of work is done by this animal during the day, especially in the early morning, as is done at night.

---

[2] Vernon Bailey, U. S. Agricultural Report, 1887, p. 448.

It is also observed by the same author, that "in the spring many of them leave their holes and travel above ground."[3] In only two cases do I recollect having observed this animal traveling in this way.

In one instance (during an open winter) an individual of this species was found by me traveling through the snow in February. At another time, an individual was observed (during a cold winter) traveling aimlessly about over the deep snows, during the latter part of February or the first of March. In both cases, these Gophers were observed near Rockford, Iowa.

Dr. C. Hart, Merriam, chief of the Division of Ornithology and Mammalogy of the U. S. Department of Agriculture, whose exhaustive and attractive works on the Pocket Gophers and other subjects in natural history entitles his statements to the highest consideration, says, regarding the general belief existing that the Pocket Gopher use their cheek pouches to "cart dirt" from their burrow's. "These cheek pouches are used exclusively in carrying food, and not in carting dirt as is often erroneously supposed." (See p. 17; North American Fauna; "Monographical Revision of the Pocket Gophers)."

Mr. Vernon Bailey, another eminent naturalist of the U. S. Department of Agriculture, says, regarding the same subject. "Although it is commonly supposed that the pouches are used for carrying dirt out of the holes, the fact is they are never used for this purpose. "In examining the pockets of more than a hundred specimens caught in traps I could find no evidence that they had been filled with earth. Occasionally specks of dirt from roots clung to the hairy inner surfaces, nothing more. If the pouches had been filled with earth, the short hairs would inevitably retain some of it. Furthermore, Gophers shot in the very act of pushing dirt from their holes had none in their pouches." (See p. 15, Bulletin, No. 5, "The Pocket Gophers of the United States)."

---

[3] The statements of this author are doubtless eminently correct, when applied to the species in the region he had under consideration (Elk River, Sherburne County, Minnesota); although apparently not applicable to the same species in the regions considered in this paper.

The writer has, however, on several occasions in northern Iowa, observed this animal (*Geomys bursarius*), to carry dirt out of its burrow in its cheek pouches, and eject it in exactly the same manner as Dr. Merriam describes their method of emptying their cheek pouches of food, which is as follows: The fore feet are brought back simultaneously along the sides of the head until they had reached a point opposite the hinder end of the pouches; they are then pressed firmly against the head and carried forward. "In this ways the contents of the pouches are promptly dumped in front of the animal." (See p. 19, Monographical Revision of the Pocket Gophers.)

This action of the fore feet is also apparently accompanied by some muscular action of the cheek pouches themselves.

This act of carrying dirt in the cheek pouches, I have personally observed, and several times killed the animal while in the very act, and have with my own hands completed the operation. I am not, however, prepared to say that this is really a constant habit of this species in northern Iowa.

It seems scarcely possible that so high authorities and keen observers as Dr. Merriam and Mr. Bailey should be deceived in their observations of the habits of this species in this respect in the regions they have studied; so we may consider their statements when applied to those regions, as eminently correct.

PHOTOGRAPHING CEDAR BIRDS.

By Dr. R. W. Shufeldt.

It is now over five years ago since the writer in The American Naturalist invited the attention of photographers to the value to science of first-class photographs of living animals, taken in natural attitudes, so that they could be used as study-models for artists and taxidermists.[1] Since contributing that

---

[1] Shufeldt, R. W. Where young amateur photographers can be of assistance to Science. The American Naturalist, V. XXV, No. 295, Phila., July, 1891, pp. 626–630. Plate XIII, Figure 1.